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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Paper No. 20040316

Application Number: 09/804,522
Filing Date: March 12, 2001
Appellant(s): JOHNSON, PAUL E.

Jennifer L. Bales (38,070)
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed January 28, 2004 (1/28/2004).

***(1) Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

***(2) Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

***(3) Status of Claims***

The statement of the status of the claims contained in the brief is correct.

***(4) Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

***(5) Summary of Invention***

The summary of invention contained in the brief is correct.

***(6) Issues***

The appellant's statement of the issues in the brief is correct.

***(7) Grouping of Claims***

The rejection of Claims 1-20 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

***(8) Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

*(9) Prior Art of Record*

| | | |
|---|---|---|
| 5,644,388 | MAEKAWA et al. | 7-1997 |
| 5,877,863 | ROSS et al. | 3-1999 |
| 4,573,796 | MARTIN et al. | 3-1986 |

*(10) Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-2, 6-8, and 13 are rejected under 35 U.S.C. 102(e). This rejection is set forth in prior Office Actions, Paper No. 10, dated 3/19/2003, and Paper No. 12, dated 8/7/2003, and copied *infra*.

Claims 3-5, 9-12, 14-20 are rejected under 35 U.S.C. 103(a). This rejection is set forth in prior Office Actions, Paper No. 10, dated 3/19/2003, and Paper No. 12, dated 8/7/2003, and copied *infra*.

Claims 1, 2, 6-8, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Maekawa *et al.* (U.S. Patent No. 5,644,388).

With regard to Claims 1, 2, and 6, Maekawa *et al.* discloses an LED illumination source device for use in a flow particle detection device, such as in a flow cytometer (See Figures 1, 3, 5, 6, 9; col. 3, line 56-col. 5, line 62), comprising an LED (See 16 in Figure 5; 29 in Figure 9; col. 5, lines 6-13) for providing light at a selected wavelength, and an optical element (See 30, 21 in Figure 9) for collecting nearly all of the light from the LED and concentrating the collected light at a selected volume within a flow sample stream. Maekawa *et al.* additionally

discloses the optical element comprising a collecting element (See 30 in Figure 9) and a focusing element (See 21 in Figure 9).

With regard to Claims 7, 8, and 13, Maekawa *et al.* discloses a particle detection apparatus, such as a flow cytometer (See Figures 1, 3, 5, 6, 9; col. 3, line 56-col. 5, line 62), comprising equipment for passing the sample stream through the flow zone (See 1, 2 in Figures 1, 3, 5, 6, 9), an illumination device (See 16 in Figure 5; 29 in Figure 9), and a detector assembly (See 14 in Figure 9), which includes a detector that detects light emitted or scattered from illuminated target particles resulting from illumination, wherein the illumination device includes an LED (See col. 5, lines 6-13) for providing light at a selected wavelength and an optical element (See 30, 21 in Figure 9) for collecting nearly all of the light from the LED and concentrating the collected light at a selected volume within a flow sample stream. Maekawa *et al.* additionally discloses the optical element comprising a collecting element (See 30 in Figure 9) and a focusing element (See 21 in Figure 9).

Claims 4, 10-12, 14-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maekawa *et al.* in view of Martin *et al.* (U.S. Patent No. 4,573,796).

With regard to Claims 4, 10-11, 14, 18, and 20, Maekawa *et al.* discloses the invention as set forth above in Claims 1 and 7. Maekawa *et al.* lacks the LED providing light at two selected wavelengths. However, Martin *et al.* teaches a multiple source flow cytometer apparatus (See Figure 1) wherein two sources (See 10 and 12 in Figure 1) with two different wavelengths (See col. 3, line 62-col. 4, line 20) are used to illuminate the particle flow (See 16 in Figure 1) to induce fluorescence and light scattering. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate sources

providing light at different wavelengths, as taught by Martin *et al.*, in the particle detection apparatus as disclosed by Maekawa *et al.* One would have been motivated to do this to provide source illumination for multiple dyes that may be bound to the particles in the sample flow and to additionally eliminate background noise due to cross-interference in multiple light sources measurements.

With regard to Claims 15 and 17, Maekawa *et al.* discloses the invention as set forth above in Claims 1 and 7. Maekawa *et al.* lacks the detector assembly comprising two detectors. However, Martin *et al.* teaches a multiple source flow cytometer apparatus (See Figure 1) wherein two or more detectors (See for example 24, 26, 32, 34 in Figure 1) are used to detect the fluorescence and scattered light from the sample particle flow (See 16 in Figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate multiple detectors, as taught by Martin *et al.*, in the particle detection apparatus as disclosed by Maekawa *et al.* One would have been motivated to do this to detect fluorescence and scattered light at multiple wavelengths from multiple dyes attached to the particles in the sample particle flow.

With regard to Claims 12 and 16, Maekawa *et al.* discloses the invention as set forth above in Claims 1 and 7. Maekawa *et al.* lacks the sample stream including two fluorescent dyes that emit at two different wavelengths. However, Martin *et al.* teaches a multiple source flow cytometer apparatus (See Figure 1) wherein the particles in the sample particle flow are stained with two or more fluorescent dyes (See col. 3, line 62-col. 4, line 20), each dye fluorescing at different wavelengths. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide multiple fluorescent dyes on the particles in the

sample particle flow, as taught by Martin *et al.*, in the particle detection apparatus as disclosed by Maekawa *et al.* One would have been motivated to do this to detect multiple components of the particles in the sample particle flow.

Claims 3, 9, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maekawa *et al.* in view of Martin *et al.*

Maekawa *et al.* in view of Martin *et al.* discloses the invention as set forth above in Claims 1, 7, and 14. Maekawa *et al.* in view of Martin *et al.* lacks the collecting element being a ball lens. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a ball lens to collect the illumination light from the light source since it is well known in the art of optics and lasers to use a ball lens to collect and collimate light from light emitting diodes and laser diodes. One would have been motivated to do this to increase the volume of the particle flow that is irradiated and therefore to increase the fluorescence collection efficiency.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maekawa *et al.* in view of Ross *et al.* (U.S. Patent No. 5,877,863).

Maekawa *et al.* discloses the invention as set forth above in Claim 1. Maekawa *et al.* lacks the LED being a side-emitting lensless LED. However, Ross *et al.* teaches a photometric diagnostic instrument (See for example Figure 1 or Figure 2) wherein the light sources (See 20 in Figure 1 or Figure 2) utilized are surface mount lensless LEDs (See col. 4, line 66-col. 5, line 16; Figure 7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate lensless LEDs as the light source, as taught by Ross *et al.*, in the LED illumination source device as disclosed by Maekawa *et al.* One would have

been motivated to do this to provide a more uniformly diverging source for illumination prior to focusing using a lens.

***(11) Response to Argument***

Applicant's arguments in the appeal brief filed 1/28/2004 (hereinafter known as the Appeal Brief) in response to the final rejection in Paper No. 12, dated 8/7/2003, and after-final interview in Paper No. 13, dated 8/27/2003, have been fully considered, but they are not persuasive.

With regard to the rejections of independent Claims 1 and 7, Applicant argues that Maekawa *et al.* "does not show, teach or suggest every element of the rejected claims, directly or inherently. Specifically it does not show '*an optical element for collecting nearly all of the light from the LED...*' as is specified in each independent claim." (Emphasis added) (See Page 4, lines 6-10 of the Appeal Brief). However, it is and has been the Examiner's assertion that Maekawa *et al.* does reasonably suggest an LED illumination source device, including an optical element for collecting nearly all of the light from the LED.

Maekawa *et al.* shows a particle flow detection apparatus including illumination source devices for use in the particle flow detection apparatus in Figures 1, 3, 5, 6 or 9. Maekawa *et al.* also shows the illumination source device for use in the particle flow detection apparatus to include at least one LED (light-emitting diode) with associated light beam collecting, routing, and focusing optics (See specifically 29, 30, 31, 21 in Figure 9). Furthermore, Maekawa *et al.* discloses that the illumination source device either is part of a particle passage monitoring system (See for example 29 in Figure 9; col. 13, line 21-col. 14, line 8) or is integrated with the fluorescence excitation source (See for example 3 in Figure 6; col. 5, lines 14-19). However, in

either case, the illumination source device is utilized to illuminate a particle flow (See col. 5, lines 6-13; col. 6, lines 47-54). With regard to the LED illumination source (See 29 in Figure 9; col. 13, lines 38-45), Maekawa *et al.* specifically discloses that a CW (continuous wave) emission type source, such as an LD (laser diode), LED, SLD (superluminescent diode) or the like (See col. 5, lines 6-13; col. 6, lines 59-62), may be used to illuminate the particle flow stream for the cell passage monitoring system. With regard to an optical element for collecting nearly all of the light from the LED, Maekawa *et al.* discloses the use of standard light collecting lenses (See for example collimator lens 30 in Figure 9) to gather and collimate the light emitted from the LED. Maekawa *et al.* additionally discloses additional optical elements (specifically plane mirror 31 and lenses 21, 26 in Figure 9) to further route and focus the incident light toward the particle flow stream (See sample flow 2 in Figure 9) and detection system (See 14 in Figure 9). The Examiner notes that, although not explicitly stated, Maekawa *et al.* intends the LED illumination source disclosed in the flow particle detection device to direct a majority, if not all, of its emitted light toward the collimating lens 30 such that the collimating lens 30 collects nearly all of the light from the LED illumination source. This is evidence by Maekawa *et al.* disclosing equivalent light sources that may be substituted for the LED, such as the above-mentioned LD, SLD, and semiconductor laser (See col. 13, lines 38-45). Such sources are well known to those skilled in the art as being **highly collimated, highly directional illumination light sources**, *i.e.* a requirement the Applicant argues would allow an optical element such as a lens to collect nearly all of the light from the illumination source (See in particular Page 4, lines 20-29 of the Appeal Brief). The highly collimated, highly directional nature of the emitted light from the illumination light source (See 29 in Figure 9) allows the collimating lens (See 30 in

Figure 9) to collect nearly all of the light from that illumination light source. Furthermore, Claims 1 and 7 fail to set forth any distinguishing structural or positional limitations (as indicated by the Applicant's arguments in Paper No. 11, dated 6/11/03, and arguments on Page 4, lines 11-19, 20-29 of the Appeal Brief) that allow an optical element to collect nearly all the light from an LED. For instance, the Applicant argues that the instant invention utilizes "a highly converging ball lens (204), placed very close to the LED light source (close enough to require removal of the LED lens...)" to collect nearly all the light from the LED light source (Page 4, lines 15-17 of the Appeal Brief). However, such limitations, as using a highly converging lens, using a ball lens, placing a lens very close to the LED light source, or removing an LED lens or front transparent dome, are not recited in Claims 1 or 7.

With regard to the remaining dependent Claims 2, 6, 8, and 13, since Applicant's only argument is that these are allowable based on their dependency on Claims 1 and 7, then the aforementioned rejection of these claims stand since Claims 1 and 7 remain rejected.

With regard to the remaining dependent Claims 3-5, 9-12, 14-20, since Applicant's only argument is that these are allowable based on either their dependency on Claims 1 and 7 or the inclusion of the limitations of Claims 1 and 7, then the aforementioned rejection of these claims stand since Claims 1 and 7 remain rejected.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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March 18, 2004

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